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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,318	09/16/2003	William Facinelli	H0004341	4181

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EXAMINER

BASINGER, SHERMAN D

ART UNIT	PAPER NUMBER
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3617

DATE MAILED: 01/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/664,318

Applicant(s)

FACINELLI ET AL.

Examiner

Sherman D. Basinger

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 7-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 7-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 12 and 20 are objected to because of the following informalities: claim 12 depends upon itself as opposed to depending upon claim 11 and in claim 20 line 4 "114 lbm" should be -114 lbs-. Appropriate correction is required.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5 and 7-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broinowski in view of Aschauer, Roos and Henmi et al.

In Broinowski the rotor with five blades is 33, the stator with 8 blades is 35, the first housing section is 14, the second housing section is 16, and as is shown in figure 1, the stator hub extends downstream of the downstream end of the second housing section. The housing section 16 is considered, due to its taper, to define a combined stator housing and nozzle. Note that the second housing tapers from an upstream end having a first diameter to a downstream end having a second diameter that is smaller than the first diameter.

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Broinowski does not disclose that the clearance between the tips of the rotor blades and the interior surface of the first housing section is within the range of about 0.050 inches and 0.150 inches, or is approximately 0.050 inches.

However, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to make the clearance between the tips of the rotor blades and the interior surface of the first housing section in Broinowski within the range of about 0.050 inches and 0.150 inches, or approximately 0.050 inches. Motivation to do so is found within the teachings of Aschauer, Roos and Henmi.

Aschauer teaches in column 1, lines 45-50 "efficiency of centrifugal pumps... depends on specific speed (hydraulic design), capacity (size of pump), inlet condition (inlet head), internal running clearances, surface roughness (casing and impeller material)...."

Roos teaches in column 2, lines 58 and 59 "tighter impeller clearances and better efficiency can be obtained".

Henmi et al teaches in Paragraph [0070] "gap length or spacing between each blade tip 110 and the inner surface 126 is depicted as C in FIG. 5. In the exemplary embodiment, C is about 0.35 mm. Of course, as the skilled artisan will recognize, C can be varied to be greater or less, as needed or desired."

Aschauer, Roos and Henmi et al all teach that a smaller clearance between the rotor blade tips and the interior surface of the housing for the rotor leads to more efficiency.

Henmi et al teaches a clearance much smaller the range of 0.050 inches and 0.150

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inches. Henmi also teaches that the skilled artisan will recognize that the clearance can be varied to be greater or less, as needed or desired.

Broinowski does not disclose that the total weight of the rotor blades is about 114 pounds, that the total blade area of the rotor blades is about 854 square inches; that the internal diameter at the downstream end of the second housing section is about 8.85 inches; that the distance from a trailing end of the stator blades and a downstream end of the second housing section is in the range of about 1.29 inches, that the pressure rise in the propulsion unit is approximately 99.4 ft H₂O at approximately 16 mph speed of the watercraft, that the water flow is between approximately 95 to 105 ft³/sec at approximately 16 mph watercraft speed, that the loading on the rotor blades is non-uniform and that the loading on the tip area of the rotor blade is greater than the loading on the hub area of the rotor blade.

However, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to design the jet propulsion unit of Broinowski such that the total weight of the rotor blades is about 114 pounds, that the total blade area of the rotor blades is about 854 square inches that the internal diameter at the downstream end of the second housing section is about 8.85 inches; that the distance from a trailing end of the stator blades and a downstream end of the second housing section is in the range of about 1.29 inches, that the pressure rise in the propulsion unit is approximately 99.4 ft H₂O at approximately 16 mph speed of the watercraft, that the water flow is between approximately 95 to 105 ft³/sec at

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approximately 16 mph watercraft speed, that the loading on the rotor blades is non-uniform and that the loading on the tip area of the rotor blade is greater than the loading on the hub area of the rotor blade.

The weight of the rotor blade, the total blade area, the internal diameter at the downstream end of the second housing section and the distance between the trailing end of the stator blades and a downstream end of the second housing are dependent on the material used to make the rotor blades, the size of the rotor blades, the size of the stator, the size of the second housing and the precision used in making the rotor, its blades and its housing. Thus, motivation to make the weight of the rotor blade, the total blade area and the internal diameter at the downstream end of the second housing section as claimed depend on how big and heavy one of ordinary skill in the art chooses to make the rotor, its blades and its housing. It also depends on how much one is willing to pay to machine or manufacture the rotor and its housing.

The loading on the blades, the pressure rise in the propulsion unit and the water flow in the propulsion unit again depends on the size of the unit and the amount of power provided to the unit to turn the rotor. These again are decisions made by one of ordinary skill in the art in accordance with what type of performance is desired and how much one is willing to invest to obtain a particular performance. Motivation to provide the claimed loading on the blade, the claimed pressure rise and the claimed water flow is found in one's desire to get a certain amount of performance from the unit at a certain cost.

Response to Arguments

3. Applicant's arguments filed December 16, 2004 have been fully considered but they are not persuasive. Applicant's arguments defer to the declaration of William Facinelli. Because this declaration has been found to be insufficient to overcome the rejection of claims 1-5 and 7-25 based upon Broinowski (see below), applicant's arguments are not persuasive.

4. The declaration under 37 CFR 1.132 filed December 16, 2004 is insufficient to overcome the rejection of claims 1-5 and 7-25 based upon Broinowski as set forth in the last Office action because:

In paragraph 6 of the declaration it is stated that the "design process differed from previous processes in that it made use of state-of-the-art computer programs that model flow dynamics. The key design computer program did not exist during the time that the Broinowski patent was filed."

In paragraph 7 of the declaration it is stated that the "design suggested by these programs dictated features such as the number of rotor blades, the number of stator blades, as well as the rotor blade/housing clearance. The rotor blade/housing clearance, an important feature in this design, is not something that a designer for this kind of application would arrive at solely based on considerations about materials, diameters, and manufacturing precision, as suggested by the examiner. These considerations would encourage a design with a large rotor/housing clearance, with no clear incentive for a relatively small value. Rather, the clearance is chosen as it relates to the above issue and also performances in particular efficiency."

With regard to what is stated in the above two paragraphs, applicant's attention is directed toward what is taught by Aschauer, Roos and Henmi et al; especially Henmi et al. From these newly cited references, it is clear that it has been known for some time that the size of the clearance between rotor blade tips and the housing of the rotor affects efficiency. The less the clearance the greater the efficiency. Henmi et al discloses a clearance even less than that claimed and disclosed by applicant and adds that "as the skilled artisan will recognize, C can be varied to be greater or less, as needed or desired". (C refers to clearance between blade tips and housing.)

The only difference between what is claimed in claim 1 and Broinowski is the amount of clearance between the rotor blade tip and the inner surface of the rotor housing.

Broinowski does not disclose a clearance value. However, in view of the teachings of Aschauer, Roos and especially Henmi et al, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains to make the rotor/housing clearance as claimed. As Henmi et al, who discloses a clearance even less than that of applicant's, states: as the skilled artisan will recognize, C can be varied to be greater or less, as needed or desired.

A flow dynamics computer program is not needed to come to this conclusion in view of the teachings of the prior art.

In paragraph 8 of the declaration it is stated efficiency "of the waterjet is linked to the clearance between the rotor blade and the housing. It would be difficult to detect performance differences without an accurate computer program. ... When we

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increased the clearance, it degraded efficiency. On the other hand, if we decreased clearance, it increased the risk that the rotor would rub against the housing.”

The sentence concerning the degrading of efficiency when clearance was increased is telling. This has been known for much time. Aschauer in 1968 knew this. A computer program was not needed to make this a known fact.

That decreasing the clearance increased the risk that the rotor would rub against the housing is a given. Anyone of ordinary skill in the art will recognize this.

The graphs in the declaration regarding efficiency, clearance and surface finish are noted. Everything shown in these graphs is known. Aschauer disclosed in 1968 that clearance and surface roughness of the casing and impeller effect efficiency.

Finally, the e mails and letters which commend the jet drive are noted. What is being considered is the allowability of the claims. Broinowski discloses the rotor with five blades 33, the stator with 8 blades 35, the first housing section 14, the second housing section 16, and the stator hub extending downstream of the downstream end of the second housing section.

What Broinowski does not disclose is that the clearance between the tips of the rotor blades and the interior surface of the first housing section is within the range of about 0.050 inches and 0.150 inches, or is approximately 0.050 inches.

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Aschauer teaches in column 1, lines 45-50 "efficiency of centrifugal pumps... depends on specific speed (hydraulic design), capacity (size of pump), inlet condition (inlet head), internal running clearances, surface roughness (casing and impeller material)...."

Roos teaches in column 2, lines 58 and 59 "tighter impeller clearances and better efficiency can be obtained".

Henmi et al teaches in Paragraph [0070] "gap length or spacing between each blade tip 110 and the inner surface 126 is depicted as C in FIG. 5. In the exemplary embodiment, C is about 0.35 mm. **Of course, as the skilled artisan will recognize, C can be varied to be greater or less, as needed or desired.**"

Aschauer, Roos and Henmi et al all teach that a smaller clearance between the rotor blade tips and the interior surface of the housing for the rotor leads to more efficiency.

Henmi et al teaches a clearance much smaller the range of 0.050 inches and 0.150 inches. Henmi also teaches that the skilled artisan will recognize that the clearance can be varied to be greater or less, as needed or desired.

Thus, despite the e mails and letters included in the affidavit, the invention defined in claim 1 is obvious in view of Broinowski as taken with Aschauer, Roos and Henmi et al.

In view of the foregoing, when all of the evidence is considered, the totality of the rebuttal evidence of nonobviousness fails to outweigh the evidence of obviousness.


Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sherman D. Basinger whose telephone number is 703-308-1139. The examiner can normally be reached on M-F (6:00-2:30 ET).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samuel J. Morano can be reached on 703-308-0230. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Sherman D. Basinger
Primary Examiner
Art Unit 3617
1/26/05

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